A STUDY ON ASSOCIATION BETWEEN Tp-e/QT RATIO (T peak-end/QT) AND IN–HOSPITAL PROGNOSIS IN ACUTE ST-ELEVATION MYOCARDIAL INFRACTION (STEMI) PATIENTS

Abstract

Background: Both the Tpeak-Tend interval (Tp-e) and the Tp-e/QT ratio have been linked to increased risk for arrhythmia. Patient Tp-e/QT ratios were investigated prior to primary to thrombolysis with ST-segment elevation myocardial infarction (STEMI).

Hypothesis: Tp-e/QT ratio maybe asscioated with the prognosis in patients with ST-segment elevation.

Methods*:* A total of 100 patients with STEMI admitted in ICCU, Madurai medical college. The Tp-e and Tp-e/QT ratio were determined using electrocardiograms in the subjects exhibiting ST-segment elevation. This is a prospective. Relevant clinical data is collected. QTd and Tp-e/QT ratio(tangent method) is calculated from "at admission ECG" just before thrombolysis. Multivariate logistic regression analysis was done to determine the predictors of in-hospital outcomes. A p-value of <0.05 is considered statistically significant.

Results: 79%were male and female 21%). Tp-e/QT ratio were 54% were present within the normal ratio of <0.25. 35% were present in ratio between0 .25-0.35. There were 11% patients in very high ratio of more than 0.35.Tp-e/QT ratio are found to be independent predictors of in MACE, Ratio was within normal limits in patients presented with anterior wall, posterior wall, anteroseptal and lateral wall MI. 39% met with major adverse cardiac events,out of which maximum number of study population had cardiogenic shock(19%) during hospital stay.13 patients met with malignant arrhythmic events (ventricular tachycardia and ventricular fibrillation).

MACE was highly significant (p<0.001) with anterolateral wall MI patients. Significant in Inferoposterior wall MI(p<0.008) and Inferiorwall MI(p<0.042).Tp-e/QT ratio is independent predictor of in-hospital mortality in addition to reduced LVEF and AWMI.

.**Conclusion:** Tp-e/QT ratio may serve as a prognostic predictors of in hospital MACE independently and Tp-e/QT ratio predicts patients with in-hospital all cause mortality in thrombolysed STEMI patients.

INTRODUCTION

Acute Myocardial infarction (AMI) represents one of the catastrophic events in the natural history of coronary artery disease (CAD). Despite remarkable advances in the treatment of AMI the occurrence of AMI is associated with substantial early and late mortality.

In majority of cases both early (out and in-hospital) and late mortality is attributed to two main sequel of acute coronary occlusion namely pump failure and arrhythmogenesis. Predominant arrhythmic events, attributing to this burden are ventricular arrhythmias namely ventricular tachycardia (VT) and ventricular fibrillation (VF).

There has been focus on the electrophysiological characterization of arrhythmogenic substrates in the myocardium of AMI patients, such as QT interval and T wave for quite sometime now. These studies have shown clinical promise for predicting malignant arrhythmias and sudden cardiac death (SCD).

Recently, the Interval from the peak to the end the T wave (T peak-Tend interval [Tp-e]) was used in predicting arrhythmias and Sudden cardiac death (SCD) in some cardiac channelopathies.

It is shown that the Tp-e interval may serve as an index of total dispersion of repolarization (transmural, apico-basal, and global). As body weight and heart rate (HR) increases, there is a linear increase in the QT interval and is accompanied by a parallel increase in the Tp-e interval. It has been suggested that the Tp-e/QT ratio is a more accurate predictor of ventricular arrhythmias than the QT interval, corrected QT(QTc), or Tp-e alone.

The Tp-e/QT ratio shows consistency within the narrow range of 0.15 to 0.25.

A higher Tp-e/QT ratio has been associated with arrhythmic events associated with many clinical conditions.

However, little is known about this index in patients with STEMI undergoing thrombolysis.

Therefore, the present study is aimed to evaluate the Tp-e/QT ratio immediately before thrombolysis in patients with STEMI and to determine their short term prognostic value in predicting Major Adverse Cardiac Events (MACE).

MATERIALS AND METHODS

STUDY POPULATION

The study will be conducted on 100 patients admitted in ICCU of Government Rajaji Hospital & Madurai Medical College with STEMI for thrombolysis during the study period from March 2018 to August 2018.

INCLUSION CRITERIA

- Age > 18 years, both sex
- Patients with ECG changes fulfilling criteria in the diagnosis of acute STEMI.

EXCLUSION CRITERIA

ECG was unsuitable for analysis i.e. if at admission ECG Shows atrial fibrillation or flutter or had left or right bundle branch block and admission ECG exhibited technical limitations for analysis of QT or Tp-e interval.

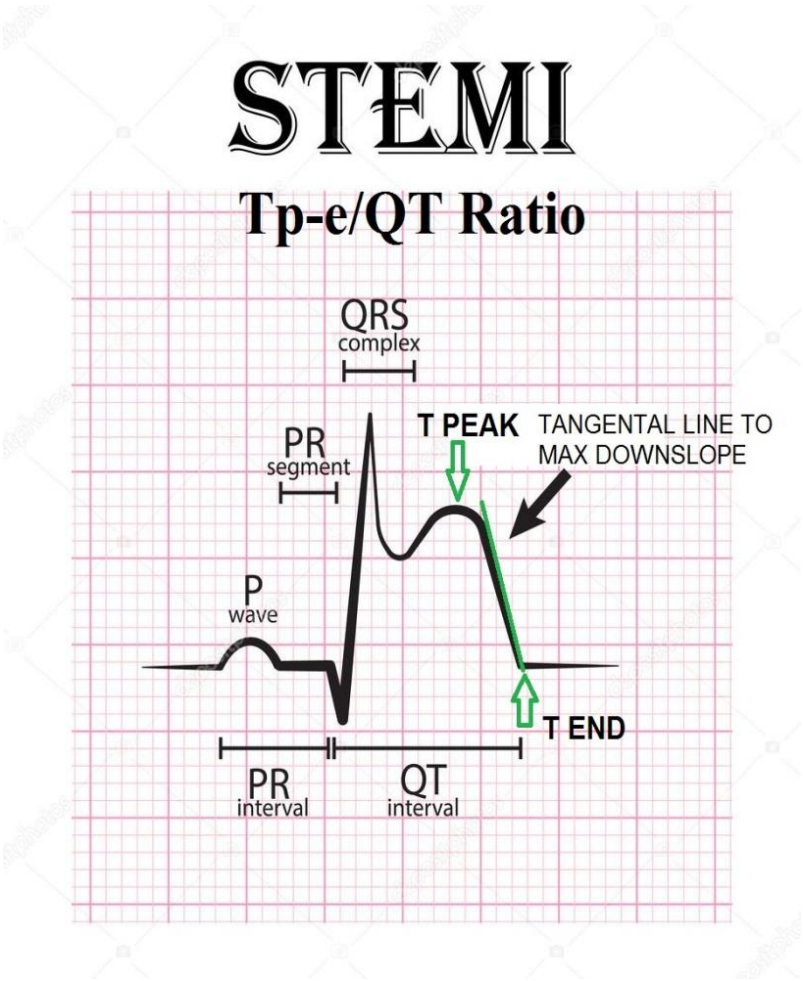
- Active renal or hepatic diseases.
- On anti-arrhythmic drugs.
- Known case of valvular heart disease or heart failure.
- If patients with electrolyte imbalances (in particular, potassium and calcium).

ANTICIPATED OUTCOME

Patients with increased Tp-e/QT ratio are at high risk of suffering both in- hospital mortality and Major Adverse Cardiac Events.

DATA COLLECTION

- A previously designed proforma will be used to collect the history, demographic and clinical details of the patient.
- ECG standard 12 leads before thrombolysis.
- The Tp-e was evaluated only in Leads exhibiting ST-segment elevation at the J point. The QT interval was measured from the onset of the QRS complex to end of T wave (Te) (defined as the point at which the tangent of the maximal down-slope of the descending limb of the T wave crossed the iso-electric baseline). T peak (Tp) is defined as maximal deflection of the T wave. The Tp-e was calculated from Tpeak to Tend.



- All measured intervals are expressed as the average of measurements made from 2 or 3 consecutive complexes.
- Follow up with 2D echocardiography
- Patients were evaluated serially throughout their hospital course to identify complications like need of inotropic support and /or ventilator support, death and ventricular arrhythmias.

DESIGN OF STUDY: Prospective analytical study.

PERIOD OF STUDY: March 2018 to August 2018

COLLABORATING DEPARTMENTS

Department of Biochemistry

Department of Cardiology

ETHICAL CLEARANCE: Approved

CONSENT: Individual written and informed

ANALYSIS: STATISTICAL METHODS:

The data collected during the study was formulated into a master chart in Microsoft office excel and statistical analysis was done with help of computer using statistical software package SPSS V.17 for windows.Using this software, frequencies, range, mean, standard deviation and 'p'were calculated through student 't' test, one way ANOVA, pearson correlation and chi square test. P value of < 0.05 was taken as significant.

CONFLICT OF INTEREST: NIL

FINANCIAL SUPPORT: NIL

PARTICIPANTS: Patients of age>18yrs, admitted as in-patients at Govt.Rajaji hospital, Madurai with features of MI

RESULTS: Out of 100 patients 79(79%) were male and 21(21%) were female which correlates with indian data of CAD population.

1. Maximum no. of study patients were between 50-60 years of age consistent with age group distribution of occurrence of acute coronary syndrome in Indian population.
2. There were equal distribution of diabetics and hypertensives among the study population, implying its non significance in role of ECG ratio interpretation.
3. MI involving AWMI were (40%). Significant number of patients (26%) were diagnosed to have inferior wall MI. Anterolateral and anteroseptal MI patients were equal number(13%).

4. 54% were present within the normal ratio of <0.25. 35% were present in ratio between0 .25-0.35. There were 11% patients in very high ratio of more than 0.35.
5. Significantly higher ratio of Tp-e/QT is seen in AWMI patients. But study showed increased ratio of Tp-e/QT ratio(>0.3) is seen in Inferoposterior wall MI and anterolateral MI .
6. Ratio was within normal limits in patients presented with anterior wall, posterior wall, anteroseptal and lateral wall MI. 39%(39) met with major adverse cardiac events,out of which maximum number of study population had cardiogenic shock(19%) during hospital stay.13 patients met with malignant arrhythmic events (ventricular tachycardia and ventricular fibrillation). 7 patients were under ventilatory support.
7. MACE was highly significant ($p<0.001$) with anterolateral wall MI patients. Significant in Inferoposterior wall MI($p<0.008$) and Inferiorwall MI($p<0.042$).

LIMITATION

The current study was a single centre study. Furthermore, the indexes in patients with STEMI were only calculated and no measurement in healthy subjects was made. Thus, no information for comparison between these groups exists, which may be useful in future studies**.**

CONCLUSION

In the STEMI, Tp-e/QT ratio is a simple and useful tool in predicting the patients at high risk of suffering adverse events in hospital.ECG being primary modality in diagnosing MI, it serves as easy, affordable tool. Since the ratio is calculated with the first taken ECG itself, expecting poor outcome, further care and monitoring can be provided. Tp-e/QT ratio may serve as a prognostic predictor of adverse outcomes after successful thrombolysis in STEMI patients, and more studies should be carried to further evaluate its clinical value.

KEYWORDS: Tp-e/QT RATIO, MI, VT/VF, MACE ARRTHYMIAS.

AIMS AND OBJECTIVES

- TO STUDY T p-e/QT RATIO VALUES IN ECG OF ST ELEVATED MI PATIENTS.
- TO CORELATE WITH MAJOR ADVERSE CARDIAC EVENTS (MACE) [HEART FAILURE, CARDIOGENIC SHOCK, VENTRICULAR TACHYARRYTHMIAS VT, VF, DEATH] DURING THE HOSPITAL STAY.